

Respiratory Protection Program for Highly Pathogenic Avian Influenza Response



Program Statement:

The purpose of this program is to ensure the safety of SART members engaged in highly pathogenic avian influenza (HPAI) control and eradication activities. Data from prior HPAI outbreaks indicate avian influenza strains that are determined to be highly pathogenic should be considered zoonotic. This program is based on the degree of risk associated with various levels and types of exposure to Highly Pathogenic Avian Influenza (HPAI) viruses. This SART Respiratory Protection Program (SART RPP) establishes guidelines and procedures to ensure comprehensive respiratory safety and training for SART members.

The SART RPP will be reviewed annually and updated as needed. The SART RPP may also be adjusted and updated based upon results of the hazard assessment conducted during emergency operations or deployments.

Scope and Acknowledgement:

All SART personnel will comply with the guidelines and standards set forth in this policy as appropriate to their roles and responsibilities. A written copy of the SART RPP and its references will be maintained in the Georgia Department of Agriculture State Veterinarian's office, and will be available for review by any team member. The response and program responsibilities outlined in this plan will be in compliance with the Incident Command System as outlined in National Incident Management System and the Georgia Emergency Support Function 11.

Upon the initiation of the SART RPP and annually thereafter, all SART members will be required to review and affirm knowledge of the program and policy. Each new team member will be required to review the policy as well as all updates as part of his/her check-in procedures at the time of deployment. Although all team members must review and affirm knowledge of the program, participation in the SART Respiratory Protection Program (RPP) will apply to personnel assigned to the Operations Section of Incident Command and other team members required to wear a respirator in the course of their duties.

SART will accept team members without any further respiratory protection training from any employing agency if the agency certifies that it has an equivalent respiratory protection program that meets the minimum U.S. Occupational Safety and Health Administration (OSHA) standards as outlined in the SART RPP and that their employee is certified in that program to wear a respirator. Each employing agency maintains legal responsibility for their employees participating in the SART RPP.

Guidance and References:

The SART RPP references the following documents:

1. OSHA Code of Federal Regulations 29 CFR 1910.134.
2. OSHA Small Entity Compliance Guide for the Revised Respiratory Protection Standard
3. CDC. "Interim Guidance for Protection of Persons Involved in U.S. Avian Influenza Outbreak Disease Control and Eradication Activities" April 7, 2006
4. OSHA. "Guidance update on Protecting Employees from Avian Flu (Avian Influenza) Viruses" 2006.
5. OSHA. Technical Manual TED 01-00-015 [TED 1-0.15A]
6. CDC. "Avian Influenza Infection in Humans" January 19, 2005.

7. CDC. “Key Facts About Avian Influenza (Bird Flu) and Avian Influenza A (H5N1) Virus” March 18, 2005.
8. NIOSH. “Histoplasmosis—Protecting workers at risk.” November 2, 2005.
9. Reference to NIMS or ICS

Definitions:

1. Medical Provider: a physician or licensed health care professional whose scope of practice authorizes them to perform medical evaluations and/or pulmonary function tests, as required, prior to respirator fit-testing.
2. Employing Agency: any employer who provides SART members from his/her agency/company/organization for emergency disease response.
3. SART RPP Administrator: the RPP program administrator appointed to run the SART RPP and evaluate its effectiveness during SART response activities. The designated SART RPP Administrator must have training and experience that enables them to fulfill the minimum standard requirements of recognizing, evaluating, and controlling the hazards associated with SART response activities.
4. Agency RPP Administrator: respiratory program administrator within each employing agency responsible for the oversight of the RPP (pre-event) for all SART members who are employed by their agency/company/organization.
5. Team Member. Prior to activation of SART, a team member is defined as any individual listed on the SART roster. Upon activation of SART, a team member is defined as any individual that has been checked-in on the incident by SART.
6. Qualitative Fit-test: A fit test that relies on a wearer’s ability to sense a test agent by smell, taste or irritation. This test can be performed on any type of respiratory protective device.
7. Quantitative Fit-test: A fit-test that quantifies the actual leakage of the respirator by comparing the concentration of particles outside the respirator with the concentration of particles inside the respirator.

Program Responsibilities:

1. Agency RPP Administrator. The agency RPP Administrator is responsible for implementing the RPP for employees of his/her agency/company/organization in compliance with Code of Federal Regulations 29 CFR 1910.134, and providing all RPP program records to the SART Incident Commander (IC), Safety Officer (SO), or SART RPP administrator (or their designee) at the time of SART deployment. The duties of the agency RPP administrator include, but are not limited to:
 - a. Arranging for and/or conducting training in respiratory protection (pre-event);
 - b. Administering the medical evaluation and fit-testing program, including identifying a medical provider and providing medical evaluations, to all eligible employees;
 - c. Maintaining all documentation of respirator eligibility (Appendix B), fit testing, as appropriate;
 - d. Updating the RPP as needed;

- e. Coordinating seasonal influenza vaccine administration for all employees that participate in the GA SART RPP (See HPAI Plan).
2. Agency Medical Provider or SART Medical Unit. Anyone who wears a respirator must successfully pass a medical evaluation prior to wearing respiratory protection. Prior to an incident, it is the participating agencies' responsibility to identify a medical provider (i.e. a physician or licensed health care professional) and provide medical evaluations for their employees. When SART is deployed, the responsibilities of the agency medical provider will be assigned to the SART medical unit. The medical provider or SART medical unit will insure the medical evaluation of each team member prior to any fit-testing or training. No team member is permitted to wear tight-fitting respirators until they are determined to be medically fit to do so. The duties of the medical provider (pre-event) or SART medical unit (during SART deployment) relative to the RPP medical evaluation shall include, but are not limited to:
- a. Ensuring that all SART members participating in activities requiring respiratory protection have read, understand and completed the *OSHA Respirator Medical Evaluation Questionnaire* (Appendix A);
 - b. Reviewing all *OSHA Respirator Medical Evaluation Questionnaires* and conducting any medical evaluations necessary to comply with this RPP within their scope of practice. Any required evaluations falling outside their scope of practice will be referred to an appropriate Health Care Facility (HCF);
 - c. Providing additional medical evaluations as necessary should a member exhibit or report signs/symptoms that interfere with their ability to use a respirator or their ability to continue work assignments;
 - d. Maintaining confidentiality of all medical evaluations, examinations, and conditions between the health care provider and team member; and
 - e. Providing the SART IC, SO, or SART RPP Administrator, or their designee with a list of personnel approved to participate in the SART RPP.
 - f. Provide pre-operational health screen of all personnel required to wear a respirator during current operational period (as outlined in SART Safety Plan)
3. Safety Officer (SO). The SO, or his/her designee, retains overall responsibility for administration of the RPP for the SART. These duties include, but are not limited to:
- a. Appointment of a SART RPP Administrator for the SART during an incident;
 - b. In consultation with SART RPP Administrator, determine appropriate work/rest cycles for each activity based upon exertion level and work conditions;
 - c. Implement policies, rules, and regulations that apply to the RPP;
 - d. Provide resources for program implementation;
 - e. Assure record-keeping.
4. SART RPP Administrator. The SART RPP Administrator will be appointed by the IC or SO in writing. The SART RPP Administrator will be responsible for oversight of the SART RPP at the incident. Responsibilities will include, but not be limited to:

- a. Identifying work areas, processes, or tasks that require members to wear respirators;
 - b. Selecting respiratory and personal protection equipment (PPE) based upon the respiratory hazard evaluation (Appendix D) associated with each work area, process or task;
 - c. Providing or verifying each team member has received appropriate respirator fit-testing and training in accordance with 29CFR 1910.139;
 - d. Ensure employing agency compliance with SART RPP;
 - e. Verifying with Agency RPP Administrators that initial medical evaluation has been conducted for all personnel participating in RPP;
 - f. Confirming that pre-operational health screen has occurred prior to any on-scene respirator fit-testing and wearing;
 - g. Coordinating the collection of all fit-testing records on team members;
 - h. Arranging for and/or conducting respirator fit-testing and training as necessary;
 - i. Maintaining a record of known respiratory hazards encountered during operations, and coordinating with the Medical Unit to incorporate into medical records;
 - j. Monitoring respirator use to ensure that operations are conducted in accordance with manufacturer specifications;
 - k. Ensuring proper storage, maintenance and disinfection in accordance with manufacturer guidelines for all respiratory equipment;
 - l. In consultation with the Safety Officer, determine appropriate work/rest cycles for each activity based upon exertion level and work conditions;
 - m. Maintain a list of SART members that are qualified to wear a respirator and will provide this information to the SART Plans Section.
2. Supervisors. The SART Supervisors include the IC, SO, Operations Chief, Branch Directors, Group Supervisors, Unit Leaders and Team Leaders. Supervisors are responsible for working with the RPP administrator and ensuring that all aspects of the RPP are implemented in the field during operations. Supervisors must ensure that the program is understood and followed by subordinates. Duties of the supervisor shall include, but are not limited to:
- a. Monitoring personnel for any adverse signs/symptoms that may interfere with their ability to safely do their job or wear their respirator;
 - b. Refer all personnel with potential adverse health signs (e.g. heat-related illness; Appendix C) to the medical unit for evaluation;
 - c. Monitoring personnel for proper fit and comfort of respiratory protection, and reporting any problems to the RPP administrator;
 - d. Ensuring personnel attached to their section have received adequate and appropriate fit-testing and training on the use, maintenance and care of all respiratory gear assigned to the section;
 - e. Ensuring the availability of appropriate respirators and accessories;
 - f. Identifying tasks and environmental conditions that may require respiratory protection and address situations with SART RPP administrator;
 - g. Ensuring proper wear, use, and maintenance of respiratory protection by team members in accordance with manufacturer's specifications and RPP guidelines and regulations;
 - h. Providing appropriate work/rest cycles for each activity as determined by the Safety Officer and SART RPP administrator.

6. Team Members. Team members determined to require respiratory protection have a responsibility to wear his/her respirators as required in accordance with the manufacturer's specifications and SART RPP guidance. Additional duties of team members shall include, but are not limited to:
 - a. Informing their supervisor, the SART RPP administrator and their agency RPP administrator of any change in health status prior to donning respiratory protection and participating in team activities;
 - b. Informing their supervisor of any discomfort, signs of heat-related illness (Appendix C), or excessive fatigue associated with incident activities;
 - c. Informing their agency RPP administrator (pre-event) or supervisor (during deployment) if their assigned respirator becomes damaged, no longer fits properly, or if they become physically incapable of wearing or using their respirator;
 - d. Participating in the employing agency RPP;
 - e. Informing their supervisor and the SART RPP administrator of any respiratory hazards in the work environment not adequately addressed by the RPP;
 - f. Maintaining, inspecting and cleaning assigned respirators according to manufacturer's guidelines and prior to each use;
 - g. Attending training related to respiratory hazards and respirator use, fit, and maintenance as required; and
 - h. Following the instructions of their supervisor and complying with required work/rest cycles.

Procedures:

1. Respiratory Hazard Evaluation. The SART RPP administrator, or his/her designee, will conduct hazard evaluations for each operation, work area or job function to determine when respiratory hazards may occur and to make recommendations for policy changes regarding work/rest cycles and the use of respirators. Guidance for the respiratory hazard evaluation is included in Appendix D. Respiratory hazard evaluations include:
 - a. Identifying and developing a list of operations where respiratory hazards may be encountered;
 - b. Reviewing work processes to determine where potential exposures to respiratory hazards may occur. This review is conducted by considering the required operations at the worksites and talking with employees and supervisors;
 - c. Assessing the role of heat stress and workload on respiratory rates and work, rest cycles.
2. Fit-Testing. The agency RPP administrator (pre-event) or SART RPP administrator (at incident), or his/her designee, will ensure all SART RPP participants have received medical clearance for assigned respirator and have been properly fit tested and trained prior to engaging in activities requiring use of a respirator, and will oversee unit fit-testing if necessary. Following the initial medical screening and clearance, all participating team members must be fit-tested properly prior to being allowed to wear any respirator with a tight fitting facepiece. Fit-testing must be conducted in compliance with the Occupational Safety and Health Administration (OSHA) standards, and in accordance with the manufacturer's guidelines and

the kit/system procedures. All team members who wear respiratory protection will have qualitative or quantitative testing completed prior to donning of gear in an incident environment. All team members must be tested with the make, model and size of the respirator they will actually wear and, preferably, with the mask that is issued to them. Fit-testing must be conducted annually. A new fit test may be required any time team members experience significant changes in their physical condition that may adversely effect their ability to safely wear a respirator (i.e. weight gain/loss, facial scarring, etc), or with any new equipment which requires a new mask.

The agency RPP administrators will maintain records of respirator eligibility, fit-testing and respirator certification records. Respirator certification will include documentation of the date the fit-test was performed and the name (or signature) of the person who conducted the test. The make and model of the tested respirator will be provided. This information shall be maintained until replaced following a subsequent certification.

Team members are required to keep copies of their personal medical clearance and fit-test records for verification. Any failure of a fit-test will be addressed immediately, and the team member will not be mobilized down-range into an area requiring respiratory protection without a recorded successful fit-test.

3. Medical Examination: Under the guidance of the agency RPP administrator, SART RPP administrator, the Medical Unit, and the SO, as appropriate, pre fit-testing medical evaluations and on-scene medical monitoring will be conducted to insure team member safety. All supervisors and team members will be advised of the signs of respirator failure and heat- and virus-related illness. It is the responsibility of all supervisors and team members to follow the recommended safety protocols and work/rest cycles, and to report any adverse events immediately to the medical unit. All team members will be required to participate in on-scene medical screening, including influenza disease surveillance.
4. Respirator Maintenance. All respirators used will be NIOSH certified, will be stored and maintained according to manufacturer's recommendations, and shall be inspected for proper function before each use. Respiratory maintenance will be the responsibility of the agency RPP administrator pre-incident. During SART deployment the SART RPP administrator will ensure that all inspections conducted by supervisors and team members include the following:
 - A check of respirator function and tightness of connections;
 - An examination of the condition of the various parts including, but not limited to, the facepiece, head straps, and filters;
 - A check of elastomeric parts for pliability and signs of deterioration.

Respirators that are determined to be defective or to have defective components, will be taken out of service immediately. Should an assigned respirator become defective, the member may wear an identical respirator make, model and size without a recorded successful fit-test, but may not wear a different style of respirator without an appropriate fit-test.

Records:

All records related to the RPP will be maintained by agency RPP administrators (pre-event) and the SART RPP administrator or Medical Unit, as appropriate. These records will include known/unknown incident exposure times, respirator clearance document, fit-test records, equipment issue records, prophylaxis distribution, and influenza disease surveillance documents. Training records for all training mandated by the RPP will be maintained by the Planning Section on-scene.

The agency RPP administrator will maintain all records related to the RPP, including pre-event and deployment records, for an appropriate amount of time per agency policy. Team members may have access to their own RPP records in accordance with OSHA guidelines.

Protections for Personnel Involved in Avian Influenza Control:

Emergency response activities associated with a potentially zoonotic avian influenza virus must be carried out in a way that protects all workers from exposures to avian influenza virus. Exposure to infected poultry and their feces or dust contaminated with feces has been associated with human infection. The HPAI Plan provides guidance for team member safety and biosecurity during SART deployment. The following includes recommendations that have been developed by the CDC, OSHA, USDA APHIS and the World Health Organization for HPAI and similar infectious diseases of poultry:

1. All persons who have been in close contact with infected poultry or contaminated media or environments, should wash their hands frequently and always after removing gloves. Hand hygiene should consist of washing with soap and water for 15-20 seconds or the use of other standard hand-disinfection procedures as specified by state government, industry, or USDA outbreak-response guidelines.
2. All workers involved in depopulating, transporting, disposing or environmental cleanup of avian influenza-infected poultry or poultry premises should be provided with appropriate PPE as determined by the SART RPP administrator and SO (HPAI Plan). As part of an overall worker protection program, respiratory PPE may include:
 - a. Respirators: the minimum recommendation is a disposable particulate respirator (e.g. N95, N99 or N100) used as part of a comprehensive respiratory protection program. The elements of such a program are described in 29 CFR 1910.134. Workers will undergo a medical evaluation and be fit tested for the make, model and size respirator they are assigned to wear and be trained to fit-check for facepiece to face seal. The SART RPP administrator will determine the respirator protection required for each operation, work area or job function according to the respiratory hazard evaluation (Appendix D);
 - b. Goggles (if eye protection not provided by respirator).

Sources of Information:

- The U.S. Centers for Disease Control and Prevention (CDC) has established avian flu public hotlines: Public 888-246-2675; Spanish 888-246-2857; and for Clinicians 877-246-4625. The CDC has additional online resources at <http://www.cdc.gov/flu/avian/index.htm>.
- The World Health Organization has information on avian flu online at http://www.who.int/csr/disease/avian_influenza/en/.
- Physicians, employers and employees should contact their local or state health department (<http://www.health.state.ga.us> for contact information) to notify them of any symptomatic employees or suspected exposure incidents.
- US Department of Agriculture, Animal and Plant Health inspection Service, http://www.aphis.usda.gov/lpa/issues/ai_us/ai_us.html

Appendix A

OSHA Respirator Medical Evaluation Questionnaire

See pdf document attached

Appendix B

Example Medical Clearance Document (page 7 of OSHA Med form)

Appendix C

Signs of Heat-related illness



Protect Yourself Heat Stress



When the body is unable to cool itself by sweating, several heat-induced illnesses such as heat stress or heat exhaustion and the more severe heat stroke can occur, and can result in death.

Factors Leading to Heat Stress

High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; some medicines; and inadequate tolerance for hot workplaces.

Symptoms of Heat Exhaustion

- Headaches, dizziness, lightheadedness or fainting.
- Weakness and moist skin.
- Mood changes such as irritability or confusion.
- Upset stomach or vomiting.

Symptoms of Heat Stroke

- Dry, hot skin with no sweating.
- Mental confusion or losing consciousness.
- Seizures or convulsions.

Preventing Heat Stress

- Know signs/symptoms of heat-related illnesses; monitor yourself and coworkers.
- Block out direct sun or other heat sources.
- Use cooling fans/air-conditioning; rest regularly.
- Drink lots of water; about 1 cup every 15 minutes.
- Wear lightweight, light colored, loose-fitting clothes.
- Avoid alcohol, caffeinated drinks, or heavy meals.

What to Do for Heat-Related Illness

- Call 911 (or local emergency number) at once.

While waiting for help to arrive:

- Move the worker to a cool, shaded area.
- Loosen or remove heavy clothing.
- Provide cool drinking water.
- Fan and mist the person with water.

For more complete information:

OSHA Occupational
Safety and Health
Administration
U.S. Department of Labor
www.osha.gov (800) 321-OSHA

OSHA 3154-07R-06

Appendix D

Respiratory Hazard Evaluation for Workers Involved in Highly Pathogenic Avian Influenza Control

The Respiratory Hazard Evaluation will be activity specific. Figure 1 provides an overview of activities associated with the surveillance, control and eradication of HPAI that will require a hazard evaluation. Figure 2 provides a decision tree for selection of appropriate respiratory protection related to level of potential exposure to virus. All respiratory hazard evaluations must consider the human infectivity and virulence properties of the influenza strain known to be (or likely to be) involved in the outbreak.

Activities on known infected premises or premises with clinical evidence of HPAI

Activities on known HPAI-infected farms or on farms experiencing high morbidity/mortality consistent with HPAI should be evaluated according to the following guidelines.

- **In house activities:** The hazard evaluation for all activities that occur inside the poultry house must consider the human health risks associated with anticipated exposures to infectious virus and the exertion level associated with the activity.

Infectious Particles/Contaminants: In-house activities are associated with increased exposure to infectious dusts/aerosols as a result of disturbance of contaminated litter and direct contact with infected birds. Consequently, minimum personal protection requires eye protection and an air-purifying respirator that removes at least 95% (N95) of airborne particles. Table 1 provides information on air purifying respirator options. Since safety goggles are not airtight and can interfere with a good respirator face seal, they may not completely prevent exposure to airborne infectious materials. Therefore, it is recommended that minimum respiratory protection for all workers engaged in sustained in-house activities on infected or suspected infected premises includes a full facepiece N95 or higher respirator when the infectious agent has been documented to cause human disease. However, if in-house duties are of short duration or specific in-house activities do not result in significant exposure to infectious dusts or aerosols, then N95 disposable masks can be used with goggles as outlined below under “Outdoor activities.”

Exertion Level: The anticipated level of exertion associated with the workload of each in-house activity and ambient climate conditions will help guide the selection of appropriate respiratory protection. Disposable N95 respirators are negative-pressure respirators. Breathing rates during activities that require heavy physical effort, especially when ambient conditions are hot and/or humid, may increase to a point where overbreathing of a negative pressure respirator occurs, resulting in periods when contaminated air enters the facepiece at gaps in the face-to-facepiece seal. Consequently, when environmental conditions and anticipated exertion levels are likely to increase breathing rates above levels safe for negative pressure respirator use, as determined by the SART RPP administrator, the use of powered air-purifying respirators (PAPRS) outfitted with a full facepiece or loose fitting hood will be considered. PAPRS create a positive pressure atmosphere, causing gaps in a face-to-facepiece seal to leak air outward rather than inward and providing additional protection against exposure to infectious particles. PAPRS may have tight-fitting facepieces or loose-fitting facepieces (Table 1). PAPRS with loose-fitting facepieces are the only respirators that adequately protect bearded workers.

Outdoor activities: The primary consideration for most outdoor activities will be the anticipated level of exposure to infectious particles/contaminants and dust particles. Exertion level may be considered under conditions of high exposure to airborne infectious particles and adverse environmental conditions (Table 2). Disposable N95 respirators should be reserved for short duration or low disease-risk situations, such as disposal of birds following inactivation of infectious particles, or activities with low exposures to virus-laden dusts, splashes, or aerosols. If outdoor activities entail high exposures to dusts or aerosols potentially contaminated with virus that has been documented to cause human disease, a full facepiece N95 or higher respirator should be considered as in “In-house Activities” above. When using N95 disposable respirators non vented goggles are preferred; however, indirectly vented goggles with a good antifog coating may be used. Directly vented goggles and safety glasses will provide limited protection, and are not recommended for protection against virus-laden fine particles, splashes, or aerosols.

Activities on premises not known or suspected of being infected with HPAI virus in the Control Area:

All premises in the infected zone that have evidence of disease (i.e. presumptive positive AI test or increased morbidity or mortality) should be considered under the guidelines above. Workers who are responsible for surveillance activities on farms with no evidence of disease in the control area should be evaluated for respiratory protection needs as outlined here.

- **Indoor activities:** Since high dust levels may be anticipated during indoor activities and the infection status of the farm cannot be assumed to be negative, minimum respiratory protection should include disposable N95 respirators with eye protection as previously described.
-
- **Outdoor activities:** Unless significant exposure to dust or birds is anticipated, outdoor activities may not require air purifying respirators or eye protection. Standard biosecurity/infection control PPE should be used.

Workers on premises in the free area:

Standard biosecurity/infection control PPE is recommended for activities in the free area unless activities are on epidemiologically-linked contact or at-risk farms (see above).

Figure 1.

Activities associated with HPAI outbreak response to be included in a respiratory hazard evaluation

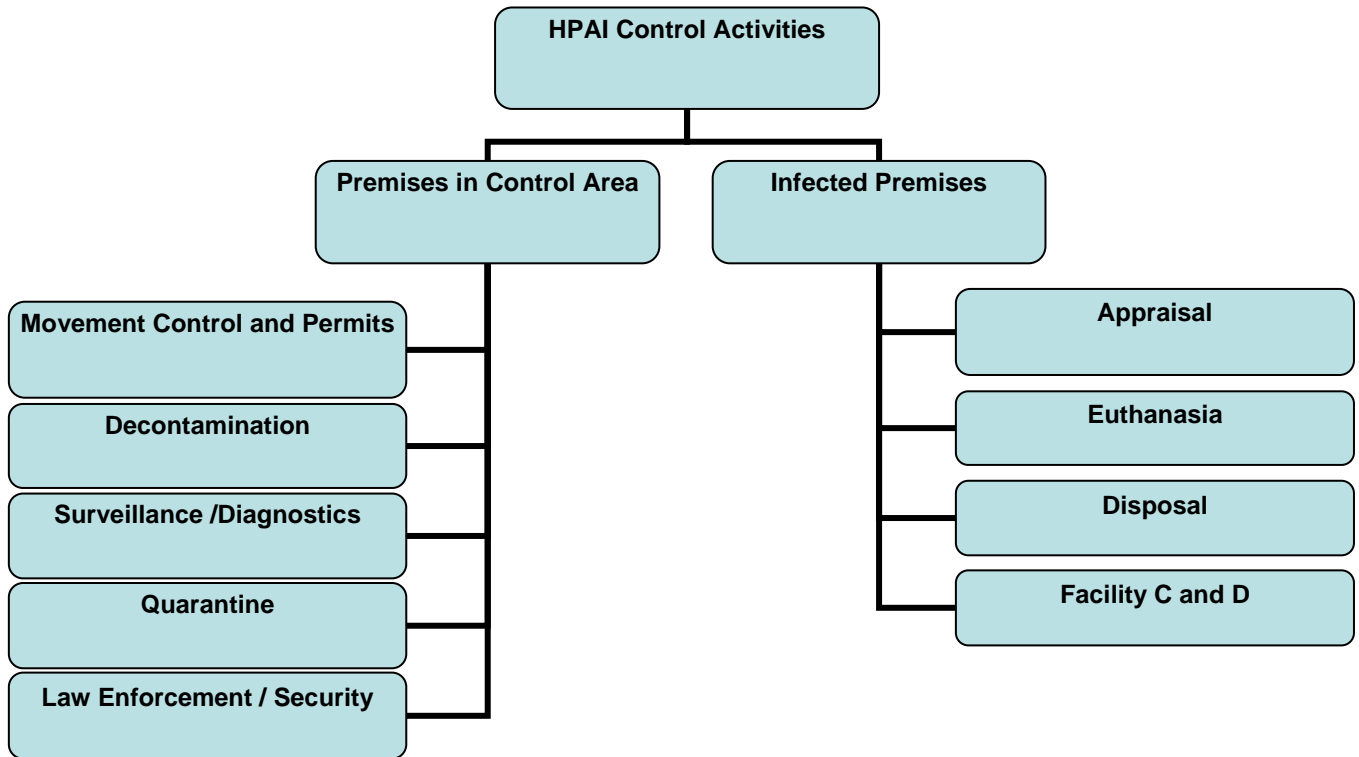
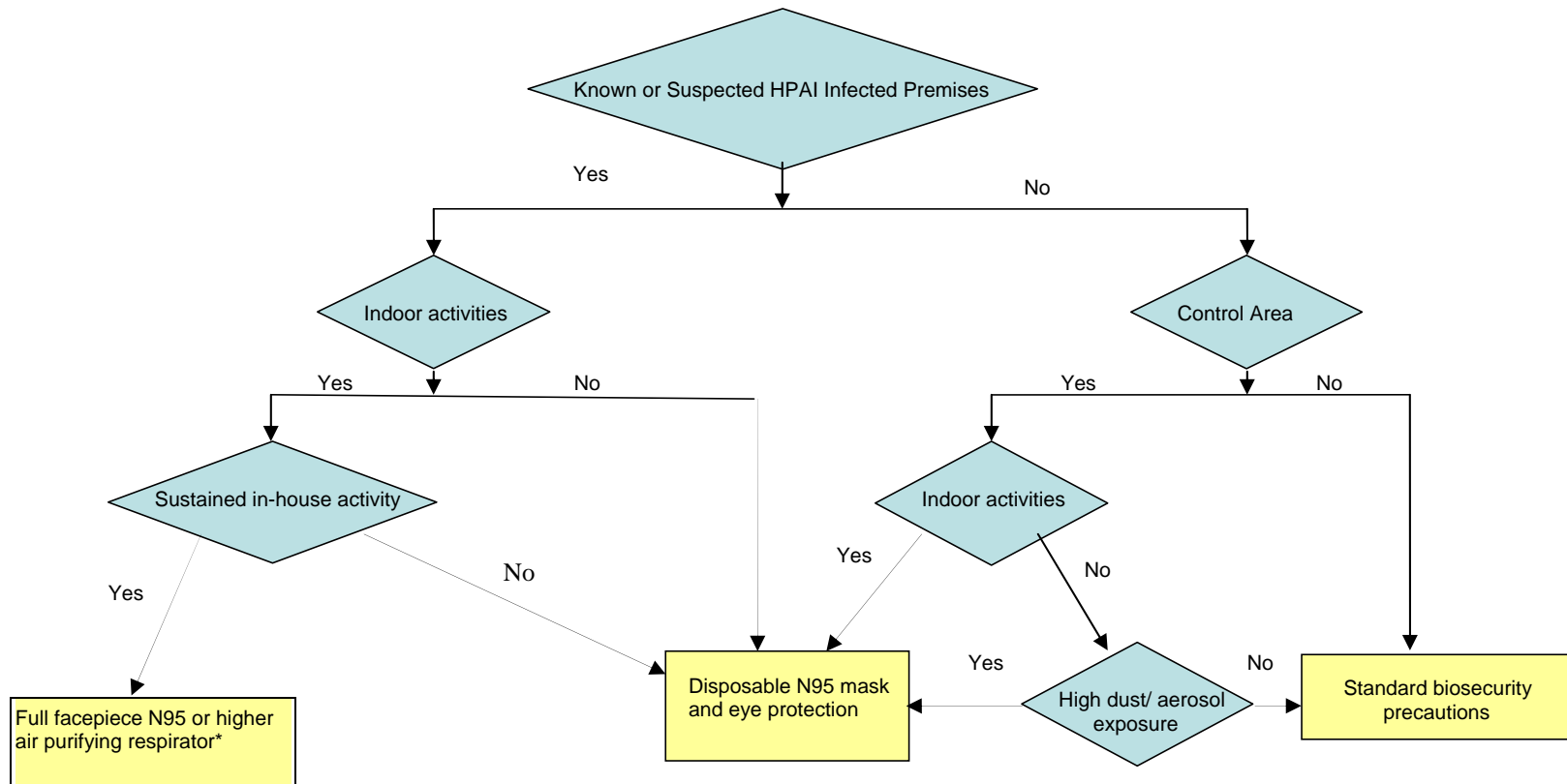


Figure 2.

Decision tree for determining appropriate respiratory protection for HPAI control activities when virus is associated with zoonotic disease risks



*For activities requiring heavy physical exertion or during periods of high heat and humidity Powered Air Purified Respirators (PAPRS) may be used

Table 1. Air-Purifying Respirators

Respirator type	NIOSH assigned protection factor ⁽¹⁰⁶⁾	Advantages	Disadvantages	Cost (2004 dollars)
Filtering facepiece (Disposable)	10	<ul style="list-style-type: none"> – lightweight – no maintenance or cleaning needed – no effect on mobility 	<ul style="list-style-type: none"> – provides no eye protection – can add to heat burden – inward leakage at gaps in face seal – some do not have adjustable head straps – difficult for a user to do a seal check – level of protection varies greatly among models – communication may be difficult – fit testing required to select proper facepiece size – some eyewear may interfere with the fit 	\$0.70 to \$10
Elastomeric half-facepiece	10	<ul style="list-style-type: none"> – low maintenance – reusable facepiece and replaceable filters and cartridges – no effect on mobility 	<ul style="list-style-type: none"> – provides no eye protection – can add to heat burden – inward leakage at gaps in face seal – communication may be difficult – fit testing required to select proper facepiece size – some eyewear may interfere with the fit 	facepiece: \$12 to \$35 filters: \$4 to \$8 each
Powered with loose-fitting facepiece	25	<ul style="list-style-type: none"> – provides eye protection – protection for people with beards, missing dentures or facial scars – low breathing resistance – flowing air creates cooling effect – face seal leakage is generally outward – fit testing is not required – prescription glasses can be worn – communication less difficult than with elastomeric half-facepiece or full-facepiece respirators – reusable components and replaceable filters 	<ul style="list-style-type: none"> – added weight of battery and blower – awkward for some tasks – battery requires charging – air flow must be tested with flow device before use 	unit: \$400 to \$1000 filters: \$10 to \$30
Elastomeric full-facepiece with N-100, R-100, or P-100 filters	50	<ul style="list-style-type: none"> – provides eye protection – low maintenance – reusable facepiece and replaceable filters and cartridges – no effect on mobility – more effective face seal than that of filtering facepiece or elastomeric half-facepiece respirators 	<ul style="list-style-type: none"> – can add to heat burden – diminished field-of-vision compared to half-facepiece – inward leakage at gaps in face seal – fit testing required to select proper facepiece size – facepiece lens can fog without nose cup or lens treatment – spectacle kit needed for people who wear corrective glasses 	facepiece: \$90 to \$240 filters: \$4 to \$8 each nose cup: \$30
Powered with tight-fitting half-facepiece or full-facepiece	50	<ul style="list-style-type: none"> – provides eye protection with full-facepiece – low breathing resistance – face seal leakage is generally outward – flowing air creates cooling effect – reusable components and replaceable filters 	<ul style="list-style-type: none"> – added weight of battery and blower – awkward for some tasks – no eye protection with half-facepiece – fit testing required to select proper facepiece size – battery requires charging – communication may be difficult – spectacle kit needed for people who wear corrective glasses with full face-piece respirators – air flow must be tested with flow device before use 	unit: \$500 to \$1000 filters: \$10 to \$30

Note: The assigned protection factors in this table are from the *NIOSH Respirator Selection Logic*.⁽¹⁰⁶⁾ When the table was prepared, OSHA had proposed amending the respiratory protection standard to incorporate assigned protection factors.⁽¹⁰⁷⁾ The Internet sites of NIOSH (www.cdc.gov/niosh) and OSHA (www.osha.gov) should be checked for the current assigned protection factor values.

Taken from NIOSH Publication 2005-109 available at <http://www.cdc.gov/niosh/docs/2005-109/#f>

Glossary:

Air purifying respirator. a respirator with an air-purifying filter that removes particles and infectious air contaminants.

Loose-fitting facepiece. a respiratory inlet covering that is designed to form a partial seal with the face.

Negative pressure respirator (tight-fitting). a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Positive pressure respirator. a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR). an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Respiratory inlet covering. that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Tight-fitting facepiece. a respiratory inlet covering that forms a complete seal with the face

References:

CDC. Interim guidance for protection of workers involved in U.S. avian influenza outbreak disease control and eradication activities. April 7, 2006. Downloaded from <http://www.cdc.gov/flu/avian/professional/protect-guid.htm>

NIOSH. Histoplasmosis—Protecting workers at risk. November 2, 2005. Downloaded from <http://www.cdc.gov/niosh/docs/2005-109/#f>

NIOSH. NIOSH Approved Disposable Particulate Respirators (Filtering Facepieces). November 2, 2005. Downloaded from http://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/

OSHA. “Guidance update on Protecting Employees from Avian Flu (Avian Influenza) Viruses” 2006. Downloaded from http://www.osha.gov/OshDoc/data_AvianFlu/avian_flu_guidance_english.pdf

OSHA. Technical Manual TED 01-00-015 [TED 1-0.15A]. Available at http://www.osha.gov/dts/osta/otm/otm_toc.html